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The impact of primary language support on the math skills of English language learners with learning disabilities

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THE IMPACT OF PRIMARY LANGUAGE SUPPORT ON THE MATH SKILLS OF
ENGLISH LANGUAGE LEARNERS WITH LEARNING DISABILITIES

By

Peter Brian Fleming

A thesis submitted in partial fulfillment of the requirements for the

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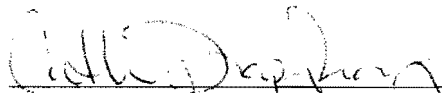
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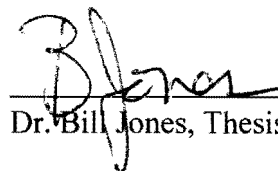
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By
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Abstract

The purpose of this study was to determine the impact of primary language support on the math skills of English learners with learning disabilities. Twelve EL learners with learning disabilities, ranging in age from 8-10, participated in this study. The experimental group received math instruction in Spanish for a five-week period, while the comparison group received their math instruction in English. Data indicated no significant difference between the groups at post-test. However, further analysis was completed that showed further research in the area of primary language support for math instruction for English learners with learning disabilities is needed.

Table of Contents

SIGNATURE PAGE.....	2
ACKNOWLEDGEMENTS.....	3
ABSTRACT.....	5
TABLE OF CONTENTS.....	6
CHAPTER 1-GOAL & PURPOSE.....	8
INTRODUCTION.....	8
ELL DEMOGRAPHICS.....	8
STATEMENT OF PROBLEM & PURPOSE.....	9
PURPOSE OF STUDY.....	10
RESEARCH QUESTION.....	10
DEFINITION OF TERMS.....	10
CHAPTER 2-LITERATURE REVIEW.....	12
LITERATURE REVIEW.....	12
USE OF THE PRIMARY LANGUAGE TO SUPPORT STUDENT'S INSTRUCTION.....	12
STRATEGIES FOR TEACHING MATHEMATICS TO ENGLISH LEARNERS.....	13
PRIMARY LANGUAGE, MATH, AND THE EL WITH LEARNING DISABILITIES.....	16
CHAPTER 3-METHODS.....	18
METHODS.....	18
RESEARCH DESIGN.....	18

SETTING AND PARTICIPANTS.....	18
CLASSROOM SETTING.....	19
PROCEDURES.....	20
PRE-TEST.....	21
TREATMENT.....	21
POST-TEST.....	22
DATA ANALYSIS.....	22
CHAPTER 4-RESULTS.....	24
PRE-TEST DIFFERENCES BETWEEN GROUPS.....	24
EFFECTIVENESS OF PRIMARY LANGUAGE MATH INSTRUCTION.....	25
RESEARCH QUESTION AND RELATED FINDINGS.....	26
CONCLUSION.....	27
CHAPTER 5-DISCUSSION.....	28
SIGNIFICANCE OF SCORES.....	28
EFFECTIVENESS OF PRIMARY LANGUAGE SUPPORT.....	29
LIMITATIONS OF STUDY.....	30
FUTURE RESEARCH.....	30
CONCLUSION.....	31
REFERENCES.....	33
APPENDICES.....	36

Chapter 1

INTRODUCTION

This study will examine the impact primary language has on the math skills of English learners with learning disabilities. Research on the topic of primary language support for mathematical instruction is limited. Since math instruction has high language demands for English learners, it is maybe more difficult for EL students with learning disabilities to understand mathematical concepts (Francis, Rivera, Rivera, Lesaux & Kieffer, 2006). The topic of primary language support for children with learning disabilities in math relates to the idea of equal opportunity for children, especially those having both language and special needs.

English Learner Demographics

One-third of all English learners or students with limited English proficiency live in California, which has more English learners and limited proficiency English speakers than any other state (Gandara, Rumberger, Maxwell-Jolly, & Callahan, 2003). In the State of California, English learners speak more than 50 different languages. There are a total of 1,468,711 English learners in California. Of this amount, 1,242,911 English learners in California speak Spanish as their primary language. Therefore, about 85% of English learners in California speak Spanish as their primary language. This is 20.1% of the total amount of enrollment of English learners (California State Department of Education, 2011). In Santa Cruz County, where this study takes place, there are 11,501 English learners. Of this amount, 11,159 English learners speak Spanish as their primary language. Therefore 97% of English learners speak Spanish as their primary language in

Santa Cruz County. This is 29.9% of the total enrollment of English learners (California State Department of Education).

Statement of Problem and Purpose

Since the early days of being a special education teacher, the principles of multiculturalism have been an important part of my belief system. A personal interest in providing primary language support began during the 1990s when bilingual education came under attack. It became evident that those who were attacking bilingual education were doing so for political gain. This was occurring during my early teaching and the issue of providing primary language support to students with learning disabilities became a passion.

The students in my Special Day Class have learning disabilities and are identified as English learners. As a special education teacher, it is important to understand that all students learn differently. Keeping this in mind it is necessary to understand the developmental needs of learners, as well as their interests and backgrounds. Students in a Special Day Class require lessons that reinforce language skills while developing new language concepts. In conducting this study, the hope is to improve math instruction specifically for English learners who have learning disabilities. This study could also have a positive effect on educators, sparking an interest in bilingual education as it relates to math instruction.

Purpose of Study

The goal of this study is to determine if providing primary language instruction to EL students with LD is more effective when providing math instruction to English learners who are Special Day Students. It is important to the student participants because it could increase their mastery of important math concepts (e.g., addition, subtraction, basic monetary skills). This study could also have a positive effect on educators and school community because it may provide vital information to the field.

As a special educator, the goal is to improve math instruction by making it more accessible to Special Day Students. This year all of my students are English learners except for one child. This study will address issues that are of concern to my students and their families. As stated, in conducting this study, the hope is to improve math instruction for English learners who have learning disabilities.

Research Question

This study will investigate the impact primary language support has on the math skills of English learners who have learning disabilities. Within this context, the research question addressed is:

1. Does primary language support impact the ability of EL students with learning disabilities to solve simple mathematical problems such as place value, and monetary computation problems?

Definition of Terms

The following terms will be used in this study. Their interpretations are important to the understanding of the significance of the study.

English Learner (EL): A student for whom there is a report of a primary language other than English on the state-approved Home Language Survey and who, on the basis of the state approved oral language (grades kindergarten through grade twelve) assessment procedures and literacy (grades three through twelve only), have been determined to lack the clearly defined English language skills of listening comprehension, speaking, reading, and writing necessary to succeed in the schools' regular instruction programs (California Department of Education, 2011).

Special Day Class (SDC): A class designed for students with mild to moderate disabilities whose IEP teams have determined that they require instruction using alternative instructional strategies.

Specific Learning Disability (SLD): A disorder in one or more of the psychological processes involved in understanding or in using language, spoken or written, which may manifest itself in the ability to listen, speak, think, read, write, spell, or do mathematical calculations (IDEA, 2004).

Speech/Language Impairment (SLI): A disorder that affects people's ability to understand and give directions, ask and answer questions and convey ideas (IDEA, 2004).

Connecting Math Concepts: A direct instruction program which is used in Special Day Classes. It includes a curriculum-based assessment that measures student performance using a simple set of procedures to determine a baseline based on student performance (Engelmann, Carnine, Kelly and Engelmann, 2003).

Chapter 2

LITERATURE REVIEW

This chapter reviews the research on primary language support for children, especially those with learning disabilities. The goal of this research is to become more effective in providing math instruction to Special Day Students, who are English learners. The three areas of this chapter include the following. Use of primary language to support students' instruction, strategies for teaching mathematics to English learners, and primary language, math, and English learners with learning disabilities.

Use of the Primary Language to Support Students' Instruction

There are ways in which a students' primary language can be used to support student instruction such as reciprocal teaching (van Garderen, 2004) and primary language cooperative learning groups (Daisy & Kampfner, 2002). Reciprocal teaching allows students who are English learners to work in small groups using cognitive strategies to comprehend information. The technique of reciprocal teaching relates to primary language support for students' instruction because students can use their primary language to clarify the meaning of mathematical terms. Since English learners may experience difficulty with word problems due to a lack of understanding mathematical vocabulary, reciprocal teaching may lead to increased student understanding of mathematical concepts.

Primary language cooperative learning groups allow English learners to use their native language to talk their way through math problems and make explanations of their reasoning (Daisy & Kampfner, 2002). Primary language cooperative learning groups can be effective in working with English learners because students being able to use their

primary language may facilitate the learning process and lead to greater student creativity. For example, combining math instruction, writing and story telling (Daisy & Kampfner).

When students can work in small groups and are encouraged to use their primary language, there could be greater understanding of academic material. Cumming-Potvin, Renshaw & van Kraayenoord, (2003) conducted a study involving student learning and language development, over a three month period using qualitative methods such as direct observation and videotaping. The three students in this study participated in activities such as a bilingual learning center, where children could reflect on their learning through informal conversations. Student growth was evident in the ways the participants expressed their new found knowledge between different contexts, such as the classroom, home and playground (Cumming-Potvin et al). As these three students interacted in the classroom, home and the playground, they applied knowledge from one language to another and were able to express new linguistic understandings. These data show that when students being able to use their primary language can create effective teaching and learning environments.

Strategies for Teaching Mathematics to English Learners

Instructional strategies such as constructivist theory may be implemented in teaching math to English learners. This strategy could be used for teaching math to English learners because the foundation of constructivist learning is that when learners actively engage in hands on learning, rather than passively receiving knowledge, comprehension of content occurs because students can demonstrate conceptual understanding (Carin & Bass, 2001). Gibbons (2003) identifies constructivist theory as

“students’ active participation in problem solving and critical thinking regarding an activity they find relevant and engaging” (p. 372). In applying constructivist theory, English learners could work on math problems by applying approaches he or she already knows. Through trial and error, English learners would balance preexisting views and approaches with new experiences to construct a new level of understanding (Gibbons). The constructivist approach may possibly be used as a teaching tool for math instruction to create learning experiences that will enable the English learner to increase his/her critical thinking skills.

In looking at strategies for teaching math to English learners, it is clear that EL students need to engage in instructional activities which are meaningful. Academic content may take on meaning when teaching and learning is occurring among students. Teachers need to spend time and effort during math instruction to ensure students are interacting with each other to develop strategies to solve problems (Baxter, Woodward, & Olson, 2001). The development of mathematical reasoning could occur when English learners are given the opportunity to work with their peers by explaining problems and trying to create strategies. This could be especially true if students are encouraged to use their primary language.

In order for English learners with learning disabilities to be successful, it is evident that teachers need to develop an understanding of how these students learn mathematics (Bresser, 2003). The teacher of English learners with learning disabilities need to talk through strategies with the student, allow students to work in small groups, use prompts with questions, and encourage communication to promote computational fluency (Bresser). In a classroom with English learners, students should be encouraged

to use their primary language while working in small groups because this approach may lead to transfer of mathematical understanding from the primary language to English.

Mathematical instruction has high language demands for English learners (Francis, Rivera, Rivera, Lesaux & Kieffer, 2006). If teachers identify language objectives each day in their lesson plans; this could increase the opportunities for English learners with learning disabilities to comprehend mathematical vocabulary (Francis et al). In developing an understanding of the connection of math and literacy skills, it is clear a strong foundation in reading can lead to proficiency in math. This is relevant to this study, because teachers of English learners, especially those with learning disabilities could present math vocabulary in the students' first language to help build a foundation of understanding of mathematical concepts. Since English learners with learning disabilities may have difficulty with understanding math concepts, activities based on mathematical vocabulary could increase math skills.

In looking for effective math instructional strategies, it is necessary to consider the idea of math and literacy not living in separate worlds that the skills involved are parallel (Kester-Phillips, Bardsley, Bach & Gibb-Brown, 2009). For example, in developing reading skills, the student must understand that letters represent sounds, and in order for a student to increase math skills, it is necessary to understand that symbols represent mathematical concepts (Kester-Phillips et al). As in this current study, primary language support strategies were used to promote literacy may also be effective in improving math instruction for English learners with learning disabilities.

Primary Language, Math, and English Learners with Learning Disabilities

Bonner (2006) conducted a study in which two bilingual 5th grade teachers were working with two different groups of students. The students were in a bilingual class, and they were able to use their primary language during classroom activities. The students in this study were primarily Hispanic and limited English-speaking students. Each group of students was given an assessment of 20 questions to measure basic math skills. One teacher in this study worked with the lower achieving students and the other worked with the higher achieving students. The teacher with the higher achieving students used math journals and whole group instruction. These students would write how they solved math problems in their math journal. The teacher with the lower achieving students used cooperative learning groups where students would be assigned two to three problems a week. These students would work on problems at home and then together at school and then make a poster depicting the solution. As a group, they explained to the class how they were able to solve the problems. The participants in each group were able to use their primary language for assignments and activities. This study took place in a regular education setting. However, English learners with learning disabilities may benefit from the instructional strategies used in this study such as grouping students based on their skills and areas of need. As a result of this study, the teachers gained insight in that differentiated instruction can help English learners to distinguish between important and unimportant information and by explaining how to solve a problem to their classmates. The students who participated in this study increased their understanding of solving word problems in their teams and in front of their class. There was also improvement in students' ability to approach other basic math problems (Bonner). This is another

example of students being able to use their primary language to explain math problems, and possibly developing a stronger mathematical foundation.

In addition to English learners with learning disabilities having difficulties in processing the language of mathematics, these students may also struggle with the understanding of basic math facts. Gersten, Jordan, & Flojo, (2005), suggested that limited mastery of arithmetic combinations (basic facts) was a “hallmark” of mathematical difficulties. One approach to working with English learners with learning disabilities is Response to Intervention (RTI). RTI is a three tiered program which provides a framework of differentiated instruction that could be tailored to mathematics.

Studies incorporating all three of these topics are very scarce. However, the studies reviewed support the use of primary language instruction as well as strategies for teaching mathematics to English learners and to students with a learning disability could also be extended to encompass the topics presented in this chapter. In Special Day Classes, students may receive instruction where information is presented in smaller segments to enable students to process academic content. The teacher or academic specialist could provide primary language support to enable student success. Primary language support may impact math skills for the student with a learning disability. This study is designed to determine the possible effects primary language support may have on the learning of math skills for English learners with learning disabilities.

Chapter 3

METHODS

The goal of this study was to determine if math instruction using primary language support for English Learners with learning disabilities by investigating the use of their primary language, which is Spanish. The research was designed to answer the research question.

Research Design

The research plan is based on quantitative methodology. This research used a quasi-experimental pretest-posttest control group design (Millsap & Maydeu-Olivares, 2009). The participants were randomly divided into two groups, both of which were pretested; followed by a treatment administered to only one group, both were posttested and the results compared. The independent variable in this study was primary language support (i.e., teaching mathematics to English Language Learners with a learning disability in their primary language). The dependent variable was mathematics achievement (i.e., basic addition and subtraction problems, place value problems, and simple money problems) as measured by the results of the post-test.

A quasi-experimental design was necessary because it was not possible to randomly select participants, as participants are restricted to the students in the classroom. In addition, as all of the participants were English learners and have identified learning disabilities and span a variety of grades 3-5.

Setting and Participants

This study took place in a public elementary school in an area in Santa Cruz County with a large Latino population. This area is a mixed agricultural and residential

area with various local businesses. There are approximately 600 students in this elementary school and it serves grades K-5.

Twelve students were selected to participate in this study. Ten of the twelve students had an identified specific learning disability. These students exhibit a disorder in the basic psychological processes in using language, which affects cognitive abilities such as association, conceptualization and expression. The other two students had been identified with speech and language impairment. These students have expressive and receptive language disorders. All participants were selected from their placement in a Special Day Class for grades 3-5. They ranged in age from 8-10. Of the twelve students, 2 were girls and 10 were boys. The students in the Special Day Class were in different grade levels, based on their age and original date of enrollment. All students were working at the same instructional level in math. Students were assigned a “participant number” to identify them in data analysis and interpretation, so that no personally identifying information will ever be used.

Classroom Setting

The Special Day Class, where this study took place is a very structured setting. There are well established routines, and clear expectations for the students. In the beginning of the day, the students entered the classroom in a single file manner, and placed their take-home folders in a box near the back of the room. When the Instructional Assistant (IA) arrived, the students’ homework and any other important paperwork were removed.

After the students went to their seats, the morning routine began. The teacher would review the daily schedule posted on the board. This included pull-outs for speech,

adaptive physical education, recesses and lunch. On Monday's, the teacher would also review the student jobs for the week. This included line leader, paper passer, and cafeteria helpers. There are other jobs the students would take turns doing on a weekly basis. As part of the beginning the day, the students and adults would stand to say The Pledge of Allegiance. The remainder of the morning routine included the calendar, Brain Gym, and journals. After the students wrote their journal entry, they read it to an adult in the classroom. If the journal entry was written in a legible manner, with correct word spacing and letter formation, they received a star and/or happy face in their journal. The morning routine took up a good portion of the morning. When it was time for the first recess, the line leader called the students to line up to go to the playground.

After the students returned from the morning recess, a timer was set for five minutes for snack time. When the timer rang, the small group instruction would begin. The teacher and the IA would each work with small groups of students using a rotational system. For instance, when instruction in each group would come to an end, the teacher and the IA would then work with another group of students. The students who were not participating in small group instruction with the teacher or IA would complete assignments in their seatwork folders. The seatwork folders contained independent work that was at the students Zone of Proximal Development. For some students this included writing tablet sheets, alphabet sheets, or simple comprehension papers.

Procedures

The 12 students were randomly assigned into an experimental and a control group. Although the students are in different grade levels, they were working on the same tasks.

Pretest

For the pretest, all students were assessed on basic mathematical skills using the appropriate grade-level assessment from *The Connecting Math Concepts Program* (Appendix I) to determine their math levels before beginning the study. *The Connecting Math Concepts Program* is a direct instruction math program, which is used in Special Day Classes. This is a curriculum-based assessment that measures student performance using a simple set of procedures to determine a baseline based on student performance (Engelmann, Carnine, Kelly & Engelmann, 2003). The content of the test included simple word problems, place value, money problems, simple addition/subtraction problems, double-digit subtraction problems without regrouping, and column addition problems.

Treatment

The experimental group received all math instruction in Spanish for 10 lessons over a period of 5 weeks while the comparison group received math instruction in English. *The Connecting Math Concepts Program* was used for instruction. The content of the lessons included the following: Writing the answers to single digit addition/subtraction problems, writing numbers that are 3 more than specified numbers, writing the number of cents for rows of dimes and pennies, saying the answer to problems that start with teen numbers and minus 1 or 2, adding/subtracting double-digit numbers without regrouping, writing answers to word problems that tell about more or less, identifying the place value of given numbers using T's (tens value) and lines (ones value).

The Connecting Math Concepts Program provides detailed explanations, provides guided practice, and introduces key concepts in a clear and understandable manner. This

direct instruction program teaches students the connections between concepts as they move through the lessons. *Connecting Math Concepts* offers a balanced emphasis on computation and problem solving that ensures conceptual understanding and give students a well-rounded view of math (Engelmann, Carnine, Kelly & Engelmann, 2003).

The first math group the teacher worked with was the experimental group. As stated these students received their math instruction in their primary language. The lessons from *The Connecting Math Concepts Program* were translated into Spanish for these students. During this time, the students in the comparison group received small group instruction from the IA. For instance, lessons from *The Reading Mastery Program* and *Language for Learning*. The students who were not working in a small group with the IA were doing their seatwork. When the experimental group finished their math lesson, they would then work independently in their seatwork folders, or with the IA for instruction from *Reading Mastery* and *Language for Learning*. At this time, the teacher worked with the comparison group, who received their math instruction in English.

Post-test

At the end of the 5-week period, both groups of students were assessed on basic mathematics skills using the appropriate grade-level assessment from *The Connecting Math Concepts Program*. The post-test was a different form of the assessment.

Data Analysis

Data from the two groups is displayed in a Summary of t-test for Equality of Means to show the difference between the groups prior to intervention. There is a Summary of t-test for the Spanish and English Groups *Connecting Math Concepts* Post-tests. Data is also displayed in a One-way ANOVA for post-test group differences to

compare the effectiveness of primary language support in math for EL students with learning disabilities.

Chapter 4

RESULTS

The purpose of this study was to determine the impact primary language support had on the math skills of English learners with learning disabilities. The student participants were divided into 2 groups (experimental and comparison). The experimental group received all math instruction in Spanish for a five week period, while the comparison group received math instruction in English. During the five week period, the students received instruction from *The Connecting Math Concepts Program*. A t-test showed no significant difference between the groups prior to intervention. The value of t is shown to be .781, with degrees of freedom 9.481 and two-tailed significance level .454. The results were $t(10) = .781, p < .454$. See Table 1.

Table 1

Summary of T-test for Equality of Means

	t	df	Sig (2-tailed)
CM-Pre-test	.781	9.481	.454

Posttest Differences Within Groups

The Connecting Math Assessment was used to assess the student's math skills at pre and posttest. All students participated in the pretest and post-test assessment of skills. The pre and post assessments were administered to each student by the same member of the research team. For the Spanish group, there was a significant difference between the pre and post-test scores as indicated by a value of t which is 26.924, with degrees of

freedom 5 and two-tailed significance level .000. The results were $t(5) = 26.924$, $p < .000$. See Table 2.

Table 2

Summary of T-test for Spanish Group CM Pre & Post-tests

	t	df	Sig. (2-tailed).
CM Pre-CM Post	26.924	5	.000

For the students who received their math instruction in English, there was a significant difference between the pre and post-test scores as indicated by a value of t which is 10.628, with degrees of freedom 5 and a two-tailed significance level .000. The results were $t(5) = 10.628$, $p < .000$. See Table 3.

Table 3

Summary of T-test for English Group CM Pre & Post-tests

	t	df	Sig. (2-tailed)
CM Pre-CM Post	10.628	5	.000

Effectiveness of Primary Language Math Instruction

In order to address the impact of the intervention of primary language support on the math skills of EL students with learning disabilities, the results of the research question will be provided.

Research Question and Related Findings

- Research Question 1: Does primary language support impact the ability of EL students with learning disabilities to solve simple mathematical problems such as place value and monetary computational problems?

The experimental (EG) and comparison groups (CG) at post-test, were compared using a one-way between groups analysis of variance (ANOVA) to compare the effectiveness of the primary language support on the math skills of the students. When the regression slope equals 1, ANOVA on gain scores produce the same F ratio, with the gain score analysis being slightly more powerful due to the lost degrees of freedom with the analysis of covariance (Dimitter & Rumrill, 2003). When the regression slope does not equal 1, ANOVA will result in a more powerful test. There was no significant difference between the comparison ($M=46.67$) and the experimental ($M=51.83$) groups, [$F(2.838)$, $p=.123$]. See Table 4.

The fourth table is a One-way ANOVA showing the sum of squares, degrees of freedom (df), and mean square of variance estimates for the between-groups variance and the within-groups variance, the value of F (the between-groups variance divided by the within-groups variance), and the significance (Sig.) of the F ratio.

Table 4

Summary of One-way ANOVA for Post-test Group Differences

CM Post	Sum Of Squares	df	Mean Square	f	Sig.
Between Groups	46.67	1	46.67	2.838	.123
Within Groups	51.83	10	51.83		

Total	98.50	11			
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Conclusion

As indicated by One-way ANOVA, there is no statistically significant difference in post-test scores between the group means as indicated by an F score of 2.838 and a significance of .123. Although there was not a significant difference in the scores, the gap closed from the pre-test to the post-test for the students who received their math instruction in Spanish. The scores are closer together from the pre-test and the posttest. Although the difference does not show significance, this data shows that the Spanish Group and the English Group both made significant growth from pretest to post-test.

Chapter 5

DISCUSSION

This study investigated the impact of primary language support on the math skills of English learners with learning disabilities. The purpose of this study was to determine if providing primary language instruction is more effective when providing math instruction to English learners who are in a Special Day Class. Within this context the research question was: Does primary language support impact the ability of English learners with learning disabilities to solve simple mathematical problems such as place value and monetary computational problems? The goal in conducting this study was to make math instruction more accessible to Special Day Students.

In order to answer the research question, the participants were divided into 2 groups, and were pretested, followed by a treatment administered to only one group. The independent variable in this study was primary language support (i.e., teaching math to English learners with a learning disability in their primary language). The dependent variable was mathematics achievement as measured by the results of the post-test. The instruction came from lessons in *The Connecting Math Concepts Program*. At the end of the treatment phase, both groups were post-tested. For data analysis, a t-test was used for the Spanish Group, and the English Group. A one-way ANOVA was also used for data analysis to determine the impact of primary language support on the math skills of EL students with learning disabilities.

Significance of Scores

The Spanish and English Groups each made significant growth. Although the test scores indicated no significant difference, the students who received math instruction in

their primary language demonstrated higher means. Therefore, as teachers, school administrators and as a society it may be time to revisit bilingual education, especially as it relates to teaching English learners with learning disabilities.

Effectiveness of Primary Language Support

Though both groups made significant gains, when the two groups are compared there is no statistically significant difference. This is indicated by a one-way between groups analysis of variance (ANOVA), which was run to determine the impact of primary language support had on the math skills of EL students with learning disabilities. The ANOVA showed no significant difference between the groups means as indicated by an F Score of 2.838 and a significance of .123. It is important to understand that even though there was no significant difference between the groups, both groups made gains. Therefore, there was no academic harm to the participants as a result of receiving instruction in their primary language. During the treatment phase of this study, the students who received math instruction in their primary language were clearly demonstrating knowledge of the lessons. For instance, after the second or third day of math instruction in the students' primary language, the participants were responding with increasing confidence. The participants were showing on task behavior, and they seemed happy that math instruction was being provided in their primary language. They were smiling as the lessons were being carried out and their responses indicated understanding of the material. It was clear that they were getting it!

The fact that there was no significant difference between the pretest and posttest scores for the students', who received their math instruction in their primary language, could be attributed to different unforeseen factors. For instance, there could have been

confusion among the students in regards to the presentation of the monetary problems. In the pretest, the coins were separated by value. In the posttest, the coins were mixed together. Perhaps if the coins were presented in separate rows in the posttest as they were in the pre-test, there may have been a significant difference in the scores.

Bonner (2006) conducted a study in which two bilingual teachers used differentiated instruction, with English learners whose primary language was Spanish. The students in this study were able to use their primary language for their assignments and activities. As a result of this study, the students showed improvement in doing word problems and other basic math problems. Although the format was different than this study, especially in regards to the manner in which the pretest and posttest were conducted, this is an example of how primary language support activities can facilitate the learning of mathematics for English learners.

Limitations of Study

In considering factors, which may have contributed to the overall scores in this study, it's clear there were some limitations. For instance, the size of the sample was very small. Another factor may have been the researcher was limited to the students in the Special Day Class. Therefore, there was no random sample. The use of the assessment came from the curriculum which was being used for the math instruction of the students in this setting.

Future Research

Although this research project has come to an end, the topic of primary language support in math for English learners with learning disabilities can be a small beginning for further study. As stated, a Special Education Conference may be a good venue to

present this study. This could motivate teachers from other school districts to conduct this study with their students. It could be interesting to see the results of this study if it were conducted in other parts of California. A Special Educator in the San Fernando Valley in Southern California, or a teacher in San Bruno in the Bay Area, may be interested in carrying out this study. In regards to possible implications, the size of the sample of participants may be an issue of concern. It could be interesting to see what the results of this study would be with a larger sample of student participants. Another implication could be the possibility of a student or students moving to another school or class during the study.

Conclusion

The test scores in this study did not show a significant difference, however, the results indicate the students who received math instruction in their primary language, and those who received instruction in English each made significant growth. Therefore, a reasonable question could be, that since there was no difference, why not provide instruction in the students' primary language? The Spanish Group had a higher mean and with more students there may have been a significant difference. As teachers, it's necessary to present instruction in a manner that is accessible to our students. This study shows that primary language support for EL students with LD did not cause academic harm to the participants. As stated, it may be time to revisit the concept of bilingual education and the teaching of English learners with learning disabilities, especially as it relates to math instruction.

In the interest of social justice, math instruction is an important topic for English learners with learning disabilities, because a strong foundation in mathematics could have

an effect on their future employment and educational opportunities. If primary language support can enable students with learning disabilities to have a strong foundation in mathematics, it may be beneficial to provide this support in math instruction.

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Connecting Math Concepts Pretest

Part 1

EXERCISE 1 PROBLEM SOLVING Word Problems

Problem A: A bug starts at 10 on the number line. Then the bug goes to a number that is 2 less. The bug ends up at what number?

A. _____

Problem B: A bug is at 10 on the number line. Then the bug goes to a number that is 3 more. The bug ends up at what number?

B. _____




Part 3

EXERCISE 3 MONEY

Write the number of cents in each item.

A.  
cents 


B.  
cents 


C.  
cents 

Part 2

EXERCISE 2 PLACE VALUE 2-Digit Numerals

Write T's and lines for each numeral.

A. 26


B. 41


Part 4

EXERCISE 4 PLACE VALUE

You're going to write numerals for T's and lines.

A.



B.



C.



D.



TTT

TT II

TTTTT

TTTT

Part 5

A. $5 + 3 =$

B. $4 + 3 =$

C. $8 + 3 =$

D. $3 + 3 =$

Part 6

A. $50 - 10 =$

D. $60 - 20 =$

B. $90 - 10 =$

E. $60 - 10 =$

C. $90 - 20 =$

Part 7

A.
$$\begin{array}{r} 30 \\ + 20 \\ \hline \end{array}$$

B.
$$\begin{array}{r} 5 \\ + 1 \\ \hline \end{array}$$

Part 8

A. $9 - 1 =$

C. $13 - 1 =$

$9 - 2 =$

$13 - 2 =$

B. $16 - 1 =$

D. $19 - 1 =$

$16 - 2 =$

$19 - 2 =$

C.
$$\begin{array}{r} 7 \\ + 2 \\ \hline \end{array}$$

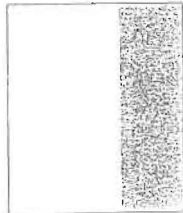
D.
$$\begin{array}{r} 50 \\ + 10 \\ \hline \end{array}$$

Connecting Math Concepts Post-test.

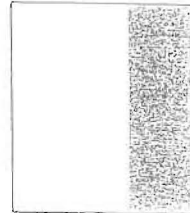
Part 1

COLUMN PROBLEMS

A. $9 - 1 = 8$



B. $6 + 2 = 8$



Part 2

MONEY

Write the number of cents for each row of coins.

A.

B.

C.

D.

E.

Part 3

PROBLEM SOLVING

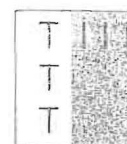
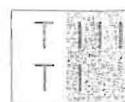
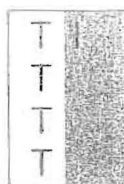
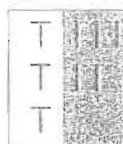
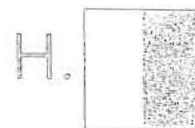
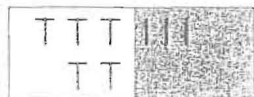
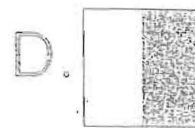
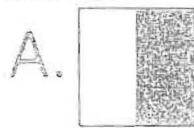
Problem A Jackson has 12. Mary has 1 less than Jackson. How many does Mary have?

A. _____

Problem B Jackson has 18. Carlos has 1 more than Jackson. How many does Carlos have?

B. _____

Part 4 Place Value Write the numeral for each box.



Part 5 Write the numerals in the column.

A.	B.	C.	D.	E.
6	26	60	16	4

A.	
B.	
C.	
D.	
E.	

Part 6

$9 - 1 =$

$8 - 0 =$

$7 - 1 =$

$7 - 0 =$

$10 - 1 =$

$6 - 1 =$

Part 7

$1+23 = \square$

$1+29 = \square$

$32+1 = \square$

$1+37 = \square$

$1+39 = \square$

$70+2 = \square$

$2+6 = \square$

$2+9 = \square$

$2+3 = \square$

$5+2 = \square$

$7+2 = \square$

$4+2 = \square$

$38+0 = \square$

$0+64 = \square$

$2+4 = \square$

Part 8

$2+24 = \square$

$2+52 = \square$

$2+37 = \square$

$2+71 = \square$

$2+76 = \square$

$2+95 = \square$

Part 9

$6+3 = \square$

$5+3 = \square$

$16+3 = \square$

$8+3 = \square$

$76+3 = \square$

$7+3 = \square$